

CRITICAL CARE ORDER SET

Diabetic ketoacidosis

ICU management of adult DKA — fluids, potassium-first safety, insulin infusion, and treating the precipitant. Check potassium before insulin, close the anion gap, and overlap basal insulin before stopping the drip. Adapt every dose to your institutional protocol and the patient in front of you.

PATIENT _____	MRN _____	WEIGHT (KG) _____	DATE / TIME _____
ALLERGIES _____	ATTENDING _____	ORDERING CLINICIAN _____	CODE STATUS _____

01 Admission & level of care

ADMISSION

- ☐ Admit / transfer to **ICU** / high-acuity unit
- ☐ Diagnosis: **diabetic ketoacidosis** — specify type 1 vs type 2; with / without coma
- ☐ Condition: critical · Level of care: ICU monitoring

MONITORING LEVEL

- ☐ Continuous cardiac telemetry
- ☐ Continuous pulse oximetry
- ☐ Nursing assessments **q1 h** while on insulin infusion

02 Monitoring, nursing & safety

VITAL SIGNS / NEURO

- ☐ Vital signs (HR, BP, RR, SpO₂, temp) **q1 h**, then space as stable
- ☐ Strict intake & output with hourly urine output
- ☐ Neuro checks **q2–4 h** — more frequent if concern for cerebral edema
- ☐ Daily weight

POINT-OF-CARE TESTING

- ☐ POC blood glucose **q1 h** while on IV insulin
- ☐ Bedside ketone measurement (β -hydroxybutyrate or capillary ketones) per protocol

LINES / ACCESS

- ☐ Two large-bore peripheral IVs
- ☐ Central venous catheter if poor access or vasoactive meds needed
- ☐ Foley catheter for strict I&O (only if clinically indicated)

SAFETY / PROPHYLAXIS

- ☐ Fall precautions
- ☐ Aspiration precautions if altered mental status
- ☐ DVT prophylaxis (see Section 10)
- ☐ Stress-ulcer prophylaxis per ICU criteria

03 Initial diagnostics

BASELINE LABS — STAT

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|--|---|
| ☐ BMP (Na, K, Cl, CO ₂ , BUN, Cr, glucose) | ☐ Mg, phosphate, Ca |
| ☐ Venous blood gas (or ABG if indicated) | ☐ Serum β -hydroxybutyrate / ketones |
| ☐ Serum osmolality (if severe hyperglycemia / AMS) | ☐ Lactate |
| ☐ CBC with differential | ☐ LFTs and INR (if indicated) |

- | | |
|--|---|
| ☐ Lipase / amylase (if abdominal pain / pancreatitis concern) | ☐ High-sensitivity troponin (if chest pain / CAD risk) |
| ☐ BNP (if heart failure suspected) | ☐ HbA1c |
| ☐ Serum pregnancy test (childbearing potential) | |

INFECTIOUS WORKUP – IF INDICATED

- ☐ Urinalysis with reflex culture
- ☐ Blood cultures ×2 (if febrile or septic)
- ☐ Chest x-ray
- ☐ Viral testing (COVID / flu / RSV) as appropriate

FOLLOW-UP LABS

- ☐ BMP, Mg, phosphate **q2–4 h** until anion gap closes and electrolytes stable
- ☐ VBG **q2–4 h** until pH > 7.3 and AG closed, then PRN
- ☐ Serum ketones / β-hydroxybutyrate **q6–12 h** (if used in protocol)
- ☐ Daily CBC, CMP, phosphate, Mg once stable

04 Fluid resuscitation

INITIAL BOLUS

- ☐ **0.9% NaCl 15–20 mL/kg** ($\approx 1\text{--}1.5\text{ L}$) IV over the first 1–2 hours
- ☐ Adjust bolus volume for heart failure, ESRD, elderly, or pregnancy

MAINTENANCE FLUIDS – AFTER BOLUS

- ☐ Corrected Na low / normal: **0.9% NaCl 250–500 mL/h**
- ☐ Corrected Na high: **0.45% NaCl 250–500 mL/h**
- ☐ Titrate based on MAP, exam, and urine output

DEXTROSE-CONTAINING FLUIDS – WHEN GLUCOSE FALLS

- ☐ When glucose $\leq 200\text{--}250\text{ mg/dL}$ and DKA not yet resolved, change to **D5 0.45% NaCl at 150–250 mL/h**
- ☐ Titrate to maintain glucose **150–200 mg/dL** while continuing insulin

VOLUME-STATUS REASSESSMENT

- ☐ Bedside assessment (JVP, lung exam, edema, mentation)
- ☐ Urine output target ≥ 0.5 mL/kg/h
- ☐ Consider POCUS of IVC and lungs
- ☐ Hold / slow fluids if signs of overload

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Potassium & electrolytes

SAFETY Check potassium **before** starting insulin. Insulin drives K^+ intracellularly and can precipitate life-threatening hypokalemia and arrhythmia.

IF $K < 3.3$ MEQ/L — HOLD INSULIN

- ☐ **HOLD insulin infusion**
- ☐ Give **KCl 40 mEq IV** (e.g., 10 mEq/h $\times 4$)
- ☐ Recheck K **q1–2 h** until ≥ 3.3 mEq/L

IF $K 3.3–5.0$ MEQ/L

- ☐ Start insulin infusion
- ☐ Add **20–30 mEq KCl** per liter of IV fluid

IF $K > 5.0$ MEQ/L

- ☐ Start insulin infusion
- ☐ Hold K supplementation initially
- ☐ Recheck K **q2 h**; start repletion when ≤ 5.0 mEq/L

MAGNESIUM

- ☐ Check Mg with initial and follow-up labs
- ☐ If $Mg < 1.8$ mg/dL or arrhythmia risk: **magnesium sulfate 2 g IV** over 1–2 h; repeat as needed

PHOSPHATE

- ☐ Check phosphate with initial and follow-up labs
- ☐ If < 1.0 mg/dL — or 1.0–1.5 with cardiopulmonary dysfunction / hemolysis risk: **potassium phosphate 15–30 mmol IV** over 4–6 h

- ☐ Monitor Ca and phosphate to avoid hypocalcemia

06 Insulin therapy — IV infusion

PREREQUISITES BEFORE STARTING INSULIN

- ☐ $K \geq 3.3$ mEq/L
- ☐ Initial fluid resuscitation started
- ☐ Evaluate for contraindications / special situations (pregnancy, severe hypokalemia)

INSULIN INFUSION — CHOOSE INSTITUTIONAL PROTOCOL

- ☐ Regular insulin 0.1 units/kg IV bolus once, then 0.1 units/kg/h infusion
- OR
- ☐ Regular insulin 0.14 units/kg/h infusion, no bolus

TARGET Aim for a glucose fall of **50–75 mg/dL per hour**. The endpoint is closing the anion gap — not normoglycemia.

INSULIN TITRATION

- ☐ If glucose drop < 50 mg/dL in the first hour, increase rate (≈ 1 – 2 units/h or 20%)
- ☐ Once glucose ≤ 200 – 250 mg/dL and DKA not resolved: reduce to **0.02–0.05 units/kg/h**, start / continue D5 0.45% NaCl, maintain glucose 150–200 mg/dL until anion gap closes

DKA RESOLUTION — FOR DOCUMENTATION

- ☐ Glucose < 200 mg/dL
- ☐ Bicarbonate ≥ 15 – 18 mEq/L
- ☐ Venous pH > 7.3
- ☐ Anion gap within normal range

07 Transition to subcutaneous insulin

CRITERIA TO TRANSITION

- ☐ DKA resolved (criteria above)
- ☐ Hemodynamically stable
- ☐ Able to take PO reliably
- ☐ No impending procedures requiring NPO

DOSING STRATEGY

- ☐ Review prior home regimen (if available and reliable)
- ☐ If none: calculate **TDD 0.5–0.7 units/kg/day** (adjust for obesity, renal function, insulin sensitivity)
- ☐ Basal = **40–50% of TDD** (glargine, detemir)
- ☐ Prandial = remainder divided TID with meals (lispro, aspart, glulisine)
- ☐ Add correctional scale before meals and at bedtime

OVERLAP Give the first dose of basal insulin **1–2 hours before** stopping the IV insulin infusion to prevent rebound ketosis.

- ☐ Endocrinology consult for regimen finalization and outpatient plan

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Bicarbonate therapy — select cases only

DEFAULT Do not administer bicarbonate unless the criteria below are met — routine use offers no benefit and carries risk.

INDICATIONS — CHECK IF PRESENT

- ☐ Venous / arterial pH < **6.9**
- ☐ Life-threatening hyperkalemia with hemodynamic compromise (per attending)

IF GIVING BICARBONATE

- ☐ **Sodium bicarbonate 100 mmol** in 400 mL sterile water + 20 mEq KCl IV over 2 h
- ☐ May repeat **q2 h** until pH ≥ 7.0
- ☐ Monitor BMP **q2 h** (Na, K, bicarbonate), volume status, and ionized Ca

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Precipitating-cause management

PEARL DKA is precipitated by a trigger — infection, missed insulin, MI, or new-onset diabetes. Resolve the metabolic crisis and find the cause in parallel.

INFECTION

- ☐ Start empiric IV antibiotics for suspected sepsis (per local protocol)
- ☐ Source-specific cultures and imaging (urine, blood, CXR, CT as indicated)
- ☐ De-escalate antibiotics when culture data available

CARDIAC / ACS

- ☐ 12-lead ECG on admission
- ☐ Serial ECGs and troponins if chest pain or risk factors
- ☐ Cardiology consult if concern for ACS

MEDICATION & OTHER TRIGGERS

- ☐ Review outpatient meds (SGLT2 inhibitors, steroids, etc.)
- ☐ Hold suspected offending agents as appropriate
- ☐ Assess for missed insulin doses and nonadherence
- ☐ Address psychosocial barriers (cost, access, understanding)

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Supportive ICU orders

DVT PROPHYLAXIS

- ☐ Enoxaparin 40 mg SC daily (CrCl $\geq$ 30, low bleeding risk)
- ☐ Unfractionated heparin 5000 units SC q8–12 h (renal impairment / high bleeding risk)
- ☐ Mechanical prophylaxis (SCDs) if pharmacologic prophylaxis contraindicated

STRESS-ULCER PROPHYLAXIS — IF INDICATED

- ☐ Pantoprazole 40 mg IV or PO daily
- ☐ Alternative PPI / H2 blocker per protocol

NUTRITION

- ☐ NPO initially if vomiting, aspiration risk, or unstable
- ☐ Begin diabetic diet when stable and tolerating PO
- ☐ Dietitian consult for diabetes / meal-planning education

PRN MEDICATIONS

- ☐ Ondansetron IV / PO for nausea
- ☐ Acetaminophen PO / IV for fever / pain
- ☐ Short-acting opioids for severe pain (with appropriate monitoring)
- ☐ Electrolyte repletion per ICU protocols (K, Mg, phosphate)

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Consults & education

CONSULTS

- ☐ Endocrinology
- ☐ Diabetes nurse educator
- ☐ Nutrition / dietitian
- ☐ Social work / case management (medication access, follow-up, insurance)

PATIENT / FAMILY EDUCATION

- ☐ Insulin administration and injection technique
- ☐ Home glucose monitoring
- ☐ Sick-day rules and when to seek care
- ☐ Follow-up appointment scheduling (PCP / endocrinology)

EDUCATIONAL USE ONLY

Not a substitute for clinical judgement. Verify doses, allergies, renal function, and contraindications. Adapt all agents and thresholds to your institutional protocols, formulary, and the individual patient.

Spreading knowledge
Improving outcomes

